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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/583,266

09/14/2006

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EXAMINER

FRANK, NOAH S

ART UNIT

PAPER NUMBER

1796

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,266	<b>Applicant(s)</b> SATGURUNATHAN ET AL.	
	<b>Examiner</b> NOAH FRANK	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/15/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

Claim 4 objected to because of the following informalities: Claim 4 refers to vinyl polymer 8. It should be vinyl polymer B. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9, 12-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeek et al. (GB 2 362 387) in view of Pears et al. (WO 93/24551).

Considering Claims 1-2: Overbeek et al. teaches aqueous coatings (1:5-10) comprising an acrylic polymer with a Tg of at least 20°C and a chain-extended polyurethane (1:30-37). The polyurethane and acrylic polymer are present in a ratio of from 3/97 to 55/45 (15:5-10). The polyurethane has an acid value of less than 35 mgKOH/g (2:1-10) and is formed from an isocyanate-terminated prepolymer and an active hydrogen chain-extending compound (2:1-10). The prepolymer is made from polyisocyanate (2:1-10), a polyol having a molecular weight of 500 to 8000 g/mol (5:15-25), optionally a polyol having molecular a weight below 500 (6:10-15), and a polyol component having an acid group such as DMPA (7:10-25). As the acid number of less

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than 35 mgKOH/g overlaps with the claimed 8 to 40 mg KOH/g, it is understood that the amount of DMPA will overlap with the claimed amount, as acid number is directly related to the amount of acid group containing reactant. Furthermore, since Overbeek teaches that the NCO:OH ratio is 1.6:1 to 2.3:1 (8:39), which overlaps with the preferred ratio of 1.6:1 to 2:1 ( $\S$ 0074 of instant specification), and the claimed molecular weights of the reactants are the same as those taught in Overbeek, the claimed percentages of polyisocyanate and polyol components will substantially overlap.

Overbeek does not teach the claimed amount of ring structure and hard segment content. However, Pears et al. teaches that when polyurethanes comprise polyester polyols which incorporate low molecular weight cycloaliphatic polyols as well as low molecular weight cycloaliphatic polyols (9:20-40), excellent chemical, water, solvent, and stain-resistance can be achieved (4:10-30). A preferred low molecular weight cycloaliphatic polyol is cyclohexane dimethanol (1:5-15). Furthermore, Overbeek teaches that cyclohexanedimethanol may be used as a polyester precursor (5:30-35) as well as a low molecular weight polyol (6:10-15). Overbeek and Pears are analogous art because they are from the same field of endeavor, namely polyurethane vinyl hybrid dispersions. At the time of the invention a person of ordinary skill in the art would have found it obvious to have chosen cyclohexanedimethanol, as taught by Pears, in the invention of Overbeek, in order to increase the chemical, water, solvent, and stain resistance of the coating. By using cyclohexane dimethanol, the claimed ring structure content and hard segment content would be achieved, as ring structure is part of the hard segment.

Overbeek is silent on the moisture vapor transmission rate. However, while all of the claimed effects or physical properties are not positively stated by the reference(s), the reference(s) teaches all of the claimed ingredients. Therefore, the claimed effects and physical properties, i.e. an MVTR of less than  $500\text{g/m}^2/24\text{h}$  would implicitly be achieved by a composite with all the claimed ingredients. If it is the applicant's position that this would not be the case: (1) evidence would need to be provided to support the applicant's position; and (2) it would be the Office's position that the application contains inadequate disclosure.

Considering Claim 3: Overbeek et al. teaches the polyurethane having a weight average molecular weight of 40,000 to 1,500,000 g/mol (11:35-39).

Considering Claims 4-5: Overbeek et al. teaches preferred vinyl monomers being 2-ethylhexylacrylate (12:21), styrene, and acrylonitrile (12:33), which meet the claimed limitations. Additionally, as these are the same monomers as are preferred in the instant invention (§0085 of instant specification), they will also be understood to meet the claimed acid value of less than 10 mg KOH/g.

Considering Claims 6-7: Overbeek et al. teaches the vinyl polymer formed of two polymers formed sequentially (3:25-35) as well as the difference in Tg being at least  $30^{\circ}\text{C}$  (1:30-35).

Considering Claim 8: Overbeek et al. teaches the weight average molecular weight of the acrylic polymers being from 100,000 to 1,500,000 g/mol (13:25-30).

Considering Claim 9: Overbeek et al. teaches the vinyl polymer(s) being prepared in the presence of the polyurethane polymer (3:35-40).

Considering Claim 12: Overbeek is silent on the stain resistance value. However, as Pears teaches that using cyclohexanedimethanol increases stain resistance (4:10-30), it is understood that the coating will achieve the claimed stain resistance, as the composition is the same.

Considering Claims 13-14: Overbeek et al. teaches the dispersions comprising pigments (15:10-15), but is silent on the amount of pigment. However, the experimental modification of this prior art in order to ascertain optimum operating conditions renders applicants' claims unpatentable in the absence of unexpected results. MPEP 2144.05. The amount of pigment controls the color and hue of the coating. Consequently it would be obvious to optimize to achieve the desired aesthetics.

Considering Claim 15: Overbeek et al. teaches the dispersion being substantially solvent-free (2:19-25).

Considering Claims 16-17: Overbeek et al. teaches neutralizing the pre-polymer before, during, or after dispersion (7:20-25), followed by chain extension (9:20-25). The acrylic polymers may be present as a blend of preformed polymers or may be prepared in-situ in the presence of the polyurethane polymer (3:25-40).

Considering Claims 18-22: Overbeek et al. teaches that the dispersions may be used as films or coatings for wood (15:10-20).

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeek et al. (GB 2 362 387) in view of Pears et al. (WO 93/24551), as applied to claim 1 above, and further in view of Grandhee (US 6,342,558).

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Considering Claims 10-11: Overbeek et al. teaches the basic claimed composition as set forth above.

Overbeek does not teach the composition further comprising a radiation curable multifunctional material. However, Grandhee teaches polyurethane acrylic hybrids (Abs) wherein the acrylic dispersion may comprise monomers such as trimethylolpropane triacrylate in order to partially crosslink the acrylic (5:50-60). Overbeek and Grandhee are analogous art because they are from the same field of endeavor, namely polyurethane vinyl hybrid dispersions. At the time of the invention a person of ordinary skill in the art would have found it obvious to have used trimethylolpropane triacrylate, as taught by Grandhee, in the invention of Overbeek, in order to partially crosslink the acrylic dispersion, resulting in increased hardness. As trimethylolpropane triacrylate is a multifunctional acrylate monomer, it meets the claimed limitations. (It should be noted that Overbeek contemplates in situ formation of the acrylic polymer component.)

### ***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NOAH FRANK whose telephone number is (571)270-3667. The examiner can normally be reached on M-F 9-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on 571-272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NF  
3-16-10

/Marc S. Zimmer/  
Primary Examiner, Art Unit 1796